

PATENT

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What is claimed is:

1. A multi-band antenna for use in conjunction with communication systems, comprising:  
a radiating element, said element containing a first slot antenna operating in the PCS frequency band and a second slot antenna operating in the AMPS frequency band;  
a reflector, said reflector coupled to said radiating element; and  
at least one transmission line to feed said first and said second slot antennas.
2. An antenna as set forth in claim 1, wherein the radiating element is comprised of a printed circuit board material.
3. An antenna as set forth in claim 2, wherein said printed circuit board material is formed of FR4.
4. An antenna as set forth in claim 1, wherein the radiating element further comprises a GPS patch antenna.
5. An antenna as set forth in claim 1, wherein the reflector coupled to the radiating element is generally rectangular in shape.
6. An antenna as set forth in claim 1, wherein the depth of the reflector is between .75 inch and 1.25 inch.

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7. An antenna as set forth in claim 1, wherein the depth of the reflector is a maximum of one-sixth of one wavelength for a signal in the PCS band.
8. An antenna as set forth in claim 1, wherein the depth of the reflector is a maximum of one-thirteen of a wavelength for a signal in the AMPS band.
9. An antenna as set forth in claim 1, wherein the amount of the radiated signal entering the passenger compartment is 10% or less of the total radiated signal.
10. An antenna as set forth in claim 2, wherein said transmission line is printed directly on said printed circuit board material.
11. An antenna as set forth in claim 1, wherein said first slot antenna and the said second slot antenna are parasitically coupled.
12. An antenna as set forth in claim 11, wherein the width of said antenna is less than 2.25 inches.
13. An antenna as set forth in claim 1, wherein said at least one transmission line contains a plug terminal for connection to said communication systems.
14. An antenna as set forth in claim 4, wherein said at GPS patch antenna contains a plug terminal for connection to said communication systems.

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15. An antenna as set forth in claim 1, wherein the length of said antenna is less than 8.25 inches.
16. An antenna as set forth in claim 1, wherein said at least one transmission line is adapted for connection to said communication systems using a pigtail.
17. An antenna as set forth in claim 17, wherein the length of said antenna is less than 6.75 inches.
18. An antenna as set forth in claim 1, wherein said first slot antenna operating in the PCS frequency band achieves a gain of -3 dB or greater.
19. An antenna as set forth in claim 1, wherein said second slot antenna operating in the AMPS frequency band achieves a gain of -3dB or greater.
20. An antenna as set forth in claim 4, wherein said GPS patch antenna achieves a gain of -3 dB or greater.
21. An antenna as set forth in claim 1, wherein said antenna uses vertical polarization as a primary mode of reception.
22. An antenna as set forth in claim 21, wherein said antenna contains a horizontal polarization component.

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